HARTCROWSER

Earth and Environmental Technologies

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Fax 206.328.5581
Tel 206.324.9530

MEMORANDUM

DATE: December 23, 1994

TO: Gregg Rapp/Potlatch

FROM: Jim Hest

RE: Construction Report for Free Product Recovery System (FPRS)
Avery Landing, Idaho
J-2296-05

Construction activities for installation of the FPRS at the Avery Landing site are summarized in Table 1. The on-site personnel during construction were:

Mike Orr and Steve Normington (and others during peak construction)	Latah Construction
Jim Hest and Jim Feider	Hart Crowser
Mark Harpole	Current Electric

The equipment used to construct the recovery trenches and utility trenches was supplied by Latah Construction and consisted of the following:

- Trackhoe - Komatsu PC300LC
- Dozer - Catapillar D-8
- Backhoe - Case 580
- Dump Truck - 10 CY International

Table 2 summarizes the groundwater and product levels in the existing monitoring wells that were measured prior to actual construction of the deep trenches. It should be noted that monitoring well HC-2 had been destroyed prior to FPRS work and could not be

located. Table 3 summarizes the groundwater and product levels in the existing monitoring wells and new extraction wells measured prior to FPRS startup. Table 4 summarizes the groundwater and product levels in the new extraction wells during FPRS startup.

Several major changes were made during the construction of the FPRS. The original design was to construct three extraction trenches totaling 450 linear feet and 150 linear feet of infiltration trench. During excavation, the extent of contamination was found to exceed the boundaries estimated for the original design. Potlatch Corporation, with the consent of Idaho Department of Environmental Quality (IDEQ), added an additional extraction trench. Four extraction trenches totaling 730 linear feet were constructed, and a modified extraction well was installed near the west end of Trench No. 1 for possible future use. Additionally, a total of 220 linear feet of infiltration trench was constructed to account for the installation of the fourth extraction trench.

Several problems were encountered during FPRS startup involving the sensors associated with two of the skimming pumps and a broken regulator, which were not operational at startup. Mark Harpole continued to troubleshoot the problems and eventually got all the skimming pumps operating properly. In concurrence with IDEQ, Potlatch shut down the FPRS for the winter on December 9, 1994, and plans to restart the system up in early April 1995.

constr.mem

Attachments:
Table 1 - Construction Activities
Table 2 - Pre-Construction Water/Product Measurements
Table 3 - Post-Construction Water/Product Measurements
Table 4 - System Startup Measurements
Construction Drawings for Avery Landing Recovery System

Table 1 - Construction Activities

Date	Activities	Comments
9/8/94	Removed top 10 feet of soil from middle to east end of Trench No. 2 with dozer, stockpiled "clean" soil for testing.	Encountered wood and concrete debris and also demolished small concrete foundations.
9/9/94	Excavated soil from depths of 10 to 20 feet and placed crushed rock from depths of 20 to 11 feet, total of 75 linear feet.	Visible hydrocarbon contamination from 12- to 20-foot depth.
9/12/94	Attempted to excavate top 10 feet of soil from middle to west end of Trench No. 2 with dozer.	Encountered major concrete structures in the Old Roundhouse area, attempted to remove with CAT and excavator.
9/13/94	Excavated soil around concrete structures in Old Roundhouse area, stockpiled "clean" soil for testing.	Unable to break up concrete. Arranged for delivery of hydraulic hammer.
9/14/94	Attached hydraulic hammer to excavator to break up concrete. Detached hydraulic hammer. Took monitoring well measurements (see Table 2).	Hydraulic hammer developed leak. Sent hammer to shop.
9/15/94	Dug a test pit 175 feet east of Trench No. 2 (east end). Continued excavating to the east and placed crushed rock from depths of 20 to 11 feet, total of 50 linear feet on Trench No. 4.	Visible hydrocarbon contamination varied from surface to depth of 20 feet. IDEQ visited site and concurred with extending trench to the east.
9/16/94	Excavated additional 75 linear feet of Trench No. 4 placing crushed rock from depths of 20 to 11 feet. Eliminated MW-1 and MW-2 during trench excavation.	Visible hydrocarbon contamination varied from surface to 20 feet. Trench installed between concrete footing on north side and piping to the south.
9/19/94	Excavated additional 60 linear feet of Trench No. 4 placing crushed rock from depths of 20 to 11 feet.	Visible hydrocarbon contamination diminished near 36-inch cast iron culvert. Ended Trench No. 4 5 feet west of culvert.
9/20/94	Excavated 80 linear feet of Trench No. 3 placing crushed rock from depths of 20 to 11 feet. Installed extraction well in Trench No. 3, bottom elevation at 78.50 feet. Stockpiled "clean" soil for testing.	Pushed soil from Trench No. 1 back into excavation on top of crushed rock with dozer. Visible hydrocarbon contamination from 12- to 20-foot depths.

Table 1 - Continued

Date	Activities	Comments
9/21/94	Excavated an additional 60 linear feet to complete Trench No. 3, placing crushed rock from depths of 20 to 11 feet. Installed extraction well in Trench No. 4, bottom elevation at 78.78 feet. Dug two test pits, located 175 and 250 feet west of pumphouse. Stockpiled "clean" soils for testing.	Visible hydrocarbon contamination from 12- to 20-foot depths. Test pit No. 1 (175'W) indicated visible hydrocarbon contamination from 12- to 20-foot depths. Test Pit No. 2 (250'W) indicated visible hydrocarbon contamination from 13- to 18-foot depths. IDEQ visited site and agreed HC-3 could be removed to install trenches.
9/22/94	Attached hydraulic hammer to excavator. Detached hydraulic hammer.	Hydraulic hammer ineffective on subsurface roundhouse concrete structures.
9/23/94	Installed extraction well in Trench No. 2, bottom elevation at 78.24 feet.	Decision was made to install fourth trench (Trench No. 1). Ordered additional equipment.
9/26/94	Excavated additional 85 linear feet to finish Trench No. 2. Placed crushed rock from depths of 20 to 11 feet. Removed monitoring well HC-3.	Visible hydrocarbon contamination from 12- to 20-foot depths. Trenched around the concrete structures.
9/27/94	Excavated 230 linear feet of infiltration trench to a depth from 6.5 to 7.5 feet and placed 2 feet of crushed rock for the infiltration bed. In addition, 140 linear feet of carrier pipe trench was excavated to a depth of 4.5 to 5.5 feet. The carrier and infiltration piping was installed with one foot of crushed rock placed over the pipe.	Infiltration trench repositioned to start 10 feet west of cast iron culvert. The carrier pipe was placed in the highway culvert and temporarily plugged.
9/28/94	Excavated 80 linear feet of Trench No. 1 placing crushed rock from depths of 20 to 11 feet. Installed extraction well in Trench No. 1, bottom elevation at 78.54 feet. Stockpiled "clean" soils for testing.	Visible hydrocarbon contamination from 12- to 20-foot depths. Contamination continued to the west. Encountered debris and ashes in upper 8 feet.
9/29/94	Excavated 85 linear feet of Trench No. 1 placing crushed rock from depths of 20 to 12 feet. Control building erected. Loaded out trench boxes. Stockpiled "clean" soils for testing. Place two piezometers in Trench No. 1.	Visible hydrocarbon contamination from 13- to 19-foot depths. Contamination continued to the west. Encountered debris and ashes in upper 8 feet.

Table 1 - Continued

Date	Activities	Comments
9/30/94	Excavated 25 linear feet of Trench No. 1 placing crushed rock from depths of 20 to 12 feet. Stockpiled "clean" soils for testing. Sampled stockpiles (1 sample/100 cy), 16 samples total.	Visible hydrocarbon contamination from 13- to 19-foot depths. Contamination continued to the west. Decided to place an additional well in Trench No. 1.
10/3/94	Excavated 40 linear feet of Trench No. 1 placing crushed rock from depths of 20 to 12 feet. Installed additional extraction well in Trench No. 1. Well casing used was 18-inch plastic culvert. Slotted bottom 12 feet with circular saw. Filled in Trench Nos. 3 and 4 with soil (excavated and stockpiled next to each trench during construction).	Visible hydrocarbon contamination from 13- to 19-foot depths. Contamination continued to the west. Stopped excavating because of Avery sewer line.
10/4/94	Set manholes over extraction wells. Filled in Trench No. 1 with soil (excavated and stockpiled next to trench during construction).	Set manholes to ensure tops are one foot above adjacent area for drainage.
10/5/94	Filled in Trench No. 2 with concrete debris and "clean" soil stockpile. Excavated trench from highway culvert to near the control building, depth from 5 to 6 feet. Installed water pipe from culvert to south of control building.	Altered path of trench because of subsurface concrete structures. Used an additional 250 linear feet of 3-inch PVC pipe to avoid structures. IDEQ visited site and approved installing earthen dike.
10/6/94	Excavated trenches for electrical, water, and product piping, at a depth of 5 feet. Started to install utilities in trench.	Utility trenches were excavated in straight lines from well to well to minimize pipe usage.
10/7/94	Continued installing utilities and started to backfill trenches. Drilled holes in manholes, inserted piping, and grouted.	
10/10/94	Finished installing utilities and continued to backfill trenches.	
10/11/94	Finished backfilling trenches and around manholes. Started to level site with CAT. Built earthen dike around AST.	
10/12/94	Finished leveling site with CAT. Insulated control building. Installed product piping from control building to tank.	Trench contractor demobilized.
10/13/94	Installed control panels.	Hart Crowser demobilized until power hookup to control building completed.

Table 1 - Continued

Date	Activities	Comments
10/24/94	Started installing flexible air and product lines through conduit pipe, electrician worked on power and sensor wiring.	Electrician completed power hook-up to control building and pulled power and sensor wires from the control house to the four extraction wells between 10/13 and 10/24.
10/25/94	Continued installing flexible air and product lines. Electrician worked on power and sensor wiring.	
10/26/94	Finish installing flexible air and product lines. Electrician worked on power and sensor wiring.	
10/27/94	Electrician finished power and sensor hookups. Set groundwater pumps in extraction wells. The intake for each pump was set 1.55 feet from bottom. Took measurements prior to starting extraction wells (see Table 3). Took measurements during operation of groundwater pumps (see Table 4).	Rained during night and all day. The river rose over a foot from day before. Started groundwater pumps at 1 p.m.
10/28/94	Took measurements prior to installing skimming pumps. Skimming pumps were set with gravity float at mid-point of traveling guides. Demobilized from site.	Extraction well No. 2 was cycling on and off indicating maximum drawdown. Skimming pumps for extraction well Nos. 2 and 4 were not operating properly because of sensor problems. The skimming pump for extraction well No. 3 was not working because of a broken part on control panel. Electrician was contacted, but was unable to come. Arrangements were made for the electrician to troubleshoot the problems and place the lids on each manhole.

Table 2 - Pre-Construction Water/Product Measurements

Identification Number	Date	Depth to Product	Depth to Groundwater	Product Thickness	T.O.C. Elevation	Groundwater Elevation
MW-4	9/14/94	ND	12.88	Trace	99.76	86.88
MW-5	9/14/94	ND	10.55	ND	97.76	87.21
MW-11	9/14/94	12.0	NA	NA	98.16	NA
HC-1R	9/14/94	ND	13.71	ND	97.50	83.79
HC-4	9/14/94	11.15	NA	NA	98.94	NA
River	9/14/94	—	—	—	—	84.18

Notes:

All depths, thicknesses, and elevations in feet. Depths referenced to monitoring well tops of casing (T.O.C.). Elevations referenced to southwest corner of concrete pad (100.0 feet).

NA - Not Available
ND - Not Detected with measuring tape and detection paste

TABLE-2.tbl

Table 3 - Post-Construction Water/Product Measurements

Identification Number	Date	Depth to Product	Depth to Groundwater	Product Thickness	T.O.C. Elevation	Groundwater Elevation
MW-5	10/27/94	ND	10.45	ND	97.76	87.31
HC-1R	10/27/94	ND	13.25	ND	97.50	84.25
HC-4	10/27/94	13.30	15.34	2.04	98.94	83.60
EW-1	10/27/94	ND	11.00	Trace	95.34	84.34
EW-2	10/27/94	ND	10.37	Trace	95.24	84.87
EW-3	10/27/94	ND	10.05	Trace	95.78	85.73
EW-4	10/27/94	ND	8.05	Trace	94.32	86.27
P-1	10/27/94	ND	17.31	ND	101.42	84.11
P-2	10/27/94	ND	15.87	ND	100.06	84.19
River	10/27/94	--	--	--	--	84.41

Notes:

MW-4 and MW-11 were unaccessible at time of measurements.
All depths, thicknesses, and elevations in feet. Depths referenced to monitoring well tops of casing (T.O.C.)
Elevations referenced to southwest corner of concrete pad (100.0 feet).

ND - Not Detected with interface probe.

TABLE-3.TBL

Table 4 - System Startup Measurements

Identification Number	Date	Time	Depth to Product	Depth to Groundwater	Product Thickness	T.O.C. Elevations	Groundwater Elevations
EW-1	10/27	1 p.m.	ND	11.00	Trace	95.34	84.34
	10/27	3 p.m.	ND	11.94	Trace	95.34	83.40
	10/28	8 a.m.	ND	12.02	Trace	95.34	83.32
EW-2	10/27	1 p.m.	ND	10.37	Trace	95.24	84.87
	10/27	3 p.m.	ND	10.77	Trace	95.24	84.47
	10/28	8 a.m.	12.57	12.80	0.23	95.24	82.44
EW-3	10/27	1 p.m.	ND	10.05	Trace	95.78	85.73
	10/27	3 p.m.	ND	11.35	Trace	95.78	84.43
	10/28	8 a.m.	ND	10.98	Trace	95.78	84.80
EW-4	10/27	1 p.m.	ND	8.05	Trace	94.32	86.27
	10/27	3 p.m.	8.81	8.83	0.02	94.32	85.49
	10/28	8 a.m.	ND	8.16	Trace	94.32	86.16
P-1	10/27	1 p.m.	ND	17.31	ND	101.42	84.11
	10/27	3 p.m.	ND	17.65	ND	101.42	83.77
	10/28	8 a.m.	ND	17.64	ND	101.42	83.78
P-2	10/27	1 p.m.	ND	15.87	ND	100.06	84.39
	10/27	3 p.m.	ND	16.16	ND	100.06	83.90
	10/28	8 a.m.	ND	16.15	ND	100.06	83.91
River	10/27	1 p.m.	—	—	—	—	84.73
	10/27	3 p.m.	—	—	—	—	84.93
	10/28	8 a.m.	—	—	—	—	85.03

Notes:

System started 10/27/94 at 1 p.m.
All depths, thicknesses, and elevations in feet. Depths referenced to monitoring well tops of casing (T.O.C). Elevations referenced to southwest corner of concrete pad (100.0 feet).

ND - Not Detected with interface probe.

TABLE-4.tbl

Table 4 - System Startup Measurements

Identification Number	Date	Time	Depth to Product	Depth to Groundwater	Product Thickness	T.O.C. Elevations	Groundwater Elevations
EW-1	10/27	1 p.m.	ND	11.00	Trace	95.34	84.34
	10/27	3 p.m.	ND	11.94	Trace	95.34	83.40
	10/28	8 a.m.	ND	12.02	Trace	95.34	83.32
EW-2	10/27	1 p.m.	ND	10.37	Trace	95.24	84.87
	10/27	3 p.m.	ND	10.77	Trace	95.24	84.47
	10/28	8 a.m.	12.57	12.80	0.23	95.24	82.44
EW-3	10/27	1 p.m.	ND	10.05	Trace	95.78	85.73
	10/27	3 p.m.	ND	11.35	Trace	95.78	84.43
	10/28	8 a.m.	ND	10.98	Trace	95.78	84.80
EW-4	10/27	1 p.m.	ND	8.05	Trace	94.32	86.27
	10/27	3 p.m.	8.81	8.83	0.02	94.32	85.49
	10/28	8 a.m.	ND	8.16	Trace	94.32	86.16
P-1	10/27	1 p.m.	ND	17.31	ND	101.42	84.11
	10/27	3 p.m.	ND	17.65	ND	101.42	83.77
	10/28	8 a.m.	ND	17.64	ND	101.42	83.78
P-2	10/27	1 p.m.	ND	15.87	ND	100.06	84.39
	10/27	3 p.m.	ND	16.16	ND	100.06	83.90
	10/28	8 a.m.	ND	16.15	ND	100.06	83.91
River	10/27	1 p.m.	—	—	—	—	84.73
	10/27	3 p.m.	—	—	—	—	84.93
	10/28	8 a.m.	—	—	—	—	85.03

Notes:

System started 10/27/94 at 1 p.m.
All depths, thicknesses, and elevations in feet. Depths referenced to monitoring well tops of casing (T.O.C). Elevations referenced to southwest corner of concrete pad (100.0 feet).

ND - Not Detected with interface probe.

TABLE-4.tbl